

What is claimed is:

1. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 1, 2, and 3 which together comprise the entire amino acid sequence of a bee venom allergen (SEQ ID NO: 4), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
2. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 5 and 6 which together comprise the entire amino acid sequence of a birch pollen allergen (SEQ ID NO: 7), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
3. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 8 and 9 which together comprise the entire amino acid sequence of a birch pollen profilin allergen (SEQ ID NO: 10), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
4. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 11, 12 and 13 which together comprise the entire amino acid sequence of a dust mite allergen (SEQ ID NO: 14), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
5. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 15 and 16 which together comprise the entire amino acid sequence of a dust mite allergen (SEQ ID NO: 17), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
6. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 5 and 8 which together comprise the entire amino acid sequence of a chimeric birch pollen allergen (SEQ ID NO: 18), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
7. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 9 and 6 which together comprise the entire amino acid

sequence of a chimeric birch pollen allergen (SEQ ID NO: 19), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.

8. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 8 and 5 which together comprise the entire amino acid sequence of a chimeric birch pollen allergen (SEQ ID NO: 20), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
9. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 6 and 9 which together comprise the entire amino acid sequence of a chimeric birch pollen allergen (SEQ ID NO: 21), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
10. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 15 and 11 which together comprise the entire amino acid sequence of a chimeric dust mite allergen (SEQ ID NO: 22), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
11. A composition comprising a plurality of contiguous overlapping peptide fragments which includes SEQ ID NOs: 13 and 16 which together comprise the entire amino acid sequence of a chimeric dust mite allergen (SEQ ID NO: 23), wherein said fragments are capable of inducing a T cell response in patients who are hypersensitive to said allergen.
12. The composition as in any one of the preceding claims, in which the contiguous overlapping peptide fragments further result in lower levels of IgE stimulation activity.
13. The composition of claim 12, wherein the lower levels of IgE stimulation activity is zero.
14. The composition of claim 12, wherein the lower levels of IgE stimulation activity is weak.
15. The composition as in any one of claims 1-11, in which the contiguous overlapping peptide fragments further result in a decrease in T cell response upon subsequent

exposure to said allergen, thereby modulating an immune response in said patients who are hypersensitive to said allergen.

16. An *in vivo* method of determining the dose of a composition needed to desensitize a patient to a specific allergen, the *in vivo* method comprising:
 - a) introducing a series of varying concentrations of a plurality of contiguous overlapping peptide fragments which together comprises the entire amino acid sequence of said allergen into the skin of said patient, wherein the fragments are capable of inducing a T cell response in patients who are hypersensitive to the allergen; further wherein the overlapping peptide fragments result in lower levels of IgE stimulation activity;
 - b) introducing a positive-control and a negative-control into the skin of said patient;
 - c) checking for development of a papule or erythema at the introduction site; and
 - d) comparing the size of the papule and erythema produced from the varying concentrations of a plurality of contiguous overlapping peptide fragments to the positive-control and negative-control,thereby determining a dose of composition needed to desensitize said patient to said specific allergen.
17. The method of claim 16, wherein the patient is selected from the group consisting of humans, dogs, cats, pigs, horses, rats and mice.
18. The method of claim 17, wherein the patient is a human.
19. The method of claim 16, wherein each peptide of said plurality of contiguous overlapping peptide fragments is 30-90 amino acids in length.
20. The method of claim 16, wherein the amino acid sequence of contiguous overlapping peptide fragments in said plurality overlap by about 10 to about 15 amino acids.
21. The method of claim 16, wherein the specific allergen is selected from the group consisting of plant pollens, grass pollens, tree pollens, weed pollens, insect venom, dust mite proteins, animal dander, saliva, fungal spores and food allergens.

22. The method of claim 21, wherein the allergen is insect venom.
23. The method of claim 22, wherein the insect venom is bee venom.
24. The method of claim 23, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 1, 2, and 3, which comprise the entire amino acid sequence of the major bee venom allergen (SEQ ID NO: 4).
25. The method of claim 21, wherein the allergen is tree pollen.
26. The method of claim 25, wherein the tree pollen is a birch pollen.
27. The method of claim 26, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 5 and 6, which comprise the entire amino acid sequence of the major birch pollen allergen (SEQ ID NO:7).
28. The method of claim 26, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 8 and 9, which comprise the entire amino acid sequence of the birch pollen profilin allergen (SEQ ID NO:10).
29. The method of claim 21, wherein the allergen is dust mite protein.
30. The method of claim 29, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 11, 12 and 13, which comprise the entire amino acid sequence of the dust mite protein (SEQ ID NO: 14).
31. The method of claim 29, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 15 and 16, which comprise the entire amino acid sequence of the dust mite protein (SEQ ID NO: 17).
32. The method of claim 16, wherein the plurality of contiguous overlapping peptide fragments includes a chimeric peptide comprising any two or more of SEQ ID NOs: 1-3, 5, 6, 8, 9, 11-13, 15 and 16.
33. The method of claim 16, wherein the introducing is done by skin prick, intradermal injection or subcutaneous injection.
34. The method of claim 16, wherein the varying concentrations of contiguous overlapping peptide fragments is from a concentration of about 0.001 µg/ml to about 100 µg/ml.

35. An *in vivo* method of inducing tolerance to a patient allergic to a specific allergen, the *in vivo* method comprising:
- a) introducing a plurality of contiguous overlapping peptide fragments which together form an entire amino acid sequence of said allergen into the skin of said patient, wherein the fragments are capable of inducing a T cell response in patients who are hypersensitive to the allergen; further wherein the overlapping peptide fragments result in lower levels of IgE stimulation activity; and
 - b) creating antibodies to said allergen,
- thereby building immunity to said allergen, wherein said immunity leads to tolerance of said allergen in said patient.
36. The method of claim 35, wherein said antibodies are IgG antibodies.
37. The method of claim 36, wherein said IgG antibodies are IgG4 antibodies.
38. The method of claim 35, wherein the patient is selected from the group consisting of humans, dogs, cats, pigs, horses, rats and mice.
39. The method of claim 38, wherein the patient is a human.
40. The method of claim 35, wherein each peptide of said plurality of contiguous overlapping peptide fragments is 30-90 amino acids in length.
41. The method of claim 35 wherein the amino acid sequence of contiguous overlapping peptide fragments in said plurality overlap by about 10 to about 15 amino acids.
42. The method of claim 35, wherein the specific allergen is selected from the group consisting of plant pollens, grass pollens, tree pollens, weed pollens, insect venom, dust mite proteins, animal dander, saliva, fungal spores and food allergens.
43. The method of claim 42, wherein the allergen is insect venom.
44. The method of claim 43 wherein the insect venom is bee venom.

45. The method of claim 44, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 1, 2, and 3, which comprise the entire amino acid sequence of the major bee venom allergen (SEQ ID NO: 4).
46. The method of claim 42, wherein the allergen is tree pollen.
47. The method of claim 46, wherein the tree pollen is a birch pollen.
48. The method of claim 47, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 5 and 6, which comprise the entire amino acid sequence of the major birch pollen allergen (SEQ ID NO:7).
49. The method of claim 47, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 8 and 9, which comprise the entire amino acid sequence of the birch pollen profilin allergen (SEQ ID NO:10).
50. The method of claim 42, wherein the allergen is a dust mite protein.
51. The method of claim 50, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 11, 12 and 13, which comprise the entire amino acid sequence of the dust mite protein (SEQ ID NO:14).
52. The method of claim 50, wherein the plurality of contiguous overlapping peptide fragments includes SEQ ID NOs: 15 and 16, which comprise the entire amino acid sequence of the dust mite protein (SEQ ID NO:17).
53. The method of claim 35, wherein the plurality of contiguous overlapping peptide fragments includes a chimeric peptide comprising any two or more of SEQ ID NOs: 1-3, 5, 6, 8, 9, 11-13, 15 and 16.
54. The method of claim 35, wherein the introducing is done by skin prick, parenteral administration, oral administration, nasal administration, mucosal administration (*e.g.*, inhalation), transdermal administration (topical), transmucosal administration, lymph node administration and rectal administration.